REMARKS

Claims 27-56 were previously cancelled as being directed to a non-elected invention. Claims 1-26, 57 and 58 are pending.

First Rejection under 35 U.S.C. §103(a)

Claims 1-22, 24, 26, 57 and 58 are rejected under 35 U.S.C. §103(a) as being obvious over Gressler *et al.* (U.S. Patent No. 5,081,103) in combination with Chevalier *et al.* (U.S. Patent No. 5,132,281) and further in combination with EP-286,135. (See Office Action page 2, last paragraph, to page 4, 2nd paragraph.)

The Examiner states that Gressler *et al.* "teaches a fluorination of superconducting YBCO powder with a fluorinated gas such as NF_2, NF_3, NF_3/O_2, etc." The Examiner indicates that Gressler *et al.* is deficient in that it "fails to teach fluorinating a superconductive film as opposed to a superconducting powder." (See Office Action page 3, 1st two paragraphs.) The Examiner states that Chevalier *et al.* "teaches a process of making fluorine-stabilized superconducting materials." (See Office Action page 3, 3rd paragraph.) The Examiner states that Gressler *et al.* in combination with Chevalier *et al.* "fail to teach spraying the superconductive material on a substrate to form a precursor film." The Examiner cites EP-286,135 as teaching "flame spraying ceramic oxide superconductors." (See Office Action page 3, last two paragraphs.)

Gressler *et al.* and Chevalier *et al.* describe methods and products which are fundamentally different from the methods and products of the present invention, as discussed below.

Claims 1-25 of the present application recite methods of making fluorinated precursors of superconducting ceramics. The steps of the method include spraying a precursor solution (comprising salts of a rare earth, of an alkaline earth metal, and of copper) onto a substrate to provide a precursor-covered substrate. The precursor-covered substrate is then fluorinated by heating in an atmosphere containing fluorinated gas. "The temperature to which the atmosphere is heated is in the range of about 300° C to about 900° C." (See specification page 12, lines 12-13.) A fluorinated precursor is formed.

To emphasize that a precursor is formed as opposed to a superconducting end product, Claim 1 has been amended to include the phrase "wherein the precursor is not superconducting." Dependent Claim 26 recites the additional step of converting the fluorinated precusor to a crystalline superconductor.

In sharp contrast to the present invention, Gressler *et al.* teaches fluorinating a superconducting crystalline powder by annealing the crystalline powder in the presence of a fluorine containing gas (col. 2, lines 48-66). Thus, a superconducting material is fluorinated. Figure 2 of Gressler *et al.* shows the X-ray diffraction pattern of the superconducting crystalline powder before and after fluorine-treatment.

Chevalier *et al.* also teaches a method of treating a superconducting material with fluorine. Thus, the material is superconducting before and after fluorine treatment. (See col. 3, lines 34-46.)

Accordingly, the method and product of the present invention are fundamentally different from those disclosed by the cited prior art. In particular, in the present invention, precursor materials are fluorinated; whereas, in the cited references, superconducting materials are fluorinated. On page 6, 2nd paragraph, of the Office Action, the Examiner implies that defining the precursor as being non-superconductive in Claim 1 would distinguish the present invention from the cited prior art.

The Examiner states that Gressler *et al.* and Chevalier *et al.* fail to teach spraying the superconductive material onto a substrate. The Examiner cites EP-286,135 for teaching flame spraying ceramic oxide superconductors (Office Action page 3, last two paragraphs). As discussed above, the methods and products of the present invention are fundamentally different from those of the cited references. The further teaching of flame spraying does not remedy the deficiencies in the primary references. Moreover, the Examiner indicates that EP-286,135 teaches formation of a superconductor after fluorine exposure. In contrast, Claim 1 of the present invention recites that after fluorine treatment a non-superconducting fluorinated precursor results.

Dependent Claim 26 of the present application recites the additional step of converting the fluorinated precusor to a crystalline superconductor. Fluorine in the precursor enhances epitaxial growth during the conversion. Fluorine is **not** incorporated into the structure of a superconducting material of the present invention. Instead, the crystalline superconductors "contain only trace amounts of fluorine." (See specification page 14, lines 22-23.)

In contrast, Gressler *et al.* teaches a method of structurally incorporating fluorine into the $YBa_2Cu_3O_{7-x}$ crystalline structure. (See col. 2, lines 64-66.) In particular, fluorine is incorporated "primarily onto the oxygen vacancies at the O(5) sites or perhaps to some extent at the O(4) sites on the CuO chains. The addition of fluorine reduces the lattice strain making it more 'orthorhombic.'" (See col. 3, lines 32-38.) The end-product has fluorine incorporated into the $YBa_2Cu_3O_{7-x}$ structure to form $YBa_2Cu_3O_{7-x}F_y$, wherein y can be up to 0.68. (See col. 4, line 1.)

Chevalier *et al.* also teaches a method of incorporating fluorine into the structure of superconducting materials. In the Chevalier *et al.* method, "The fluorine atoms are distributed for the most part in the external layer of such materials." (See col. 4, lines 60-61.)

Claims 57 and 58 recite a method of inhibiting the conversion of a fluorinated precursor film of the present invention into a crystalline superconducting film. The method comprises adding a small amount of fluorinated gas during a heat treatment process by which a precursor film is to be converted into a crystalline film. None of the cited references even remotely suggest such a method.

Accordingly, Applicants respectfully request that the obviousness rejection be withdrawn.

Second Rejection under 35 U.S.C. §103(a)

Claims 23 and 25 are rejected under 35 U.S.C. §103(a) as being obvious over Gressler *et al.* in combination with Chevalier *et al.*, further in combination with EP-286,135, still further in combination with Ovshinsky *et al.* (U.S. Patent No. 5,132,281) or JP 01-83651. (See Office Action page 4, 3rd paragraph.)

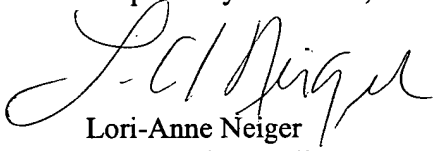
The Examiner states that Gressler *et al.* in combination with Chevalier *et al.* further in combination with EP-286,135 "fail to teach a plasma discharge for forming the superconducting material." (See Office Action page 4, 4th paragraph.) The Examiner indicates that JP 01-83651 and Ovshinsky *et al.* teach plasma discharge and glow discharge plasma, respectively. (See Office Action page 4, last two paragraphs.)

As discussed above, unlike the present invention, both of the primary references teach fluorinating a superconducting material. Whereas, the methods of the present invention require fluorinating a precursor material (*i.e.*, not a superconducting material). The teaching of flame spraying, and the further teaching of plasma discharge, do not remedy the deficiencies in the primary references.

Accordingly, Applicants respectfully request that the obviousness rejection be withdrawn.

Applicants respectfully submit that the application is now in condition for allowance, which action is earnestly solicited. If resolution of any remaining issue is required prior to allowance of this application, it is respectfully requested that the Examiner contact Applicants' undersigned attorney at the telephone number provided below.

Respectfully submitted,



Lori-Anne Neiger
Attorney for Applicants
Registration No. 44,949

Date: June 26, 2006

Lori-Anne Neiger
Patent Counsel
Brookhaven National Laboratory
Bldg. 475D
P.O. Box 5000
Upton, New York 11973-5000
(631) 344-3035